Republic of South Africa

EDICT OF GOVERNMENT

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SANS 1475-1 (2010) (English): The production of reconditioned fire-fighting equipment Part 1: Portable and wheeled (mobile) rechargeable fire extinguishers

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Edition 3.4

SWAZILAND NATIONAL STANDARD

The production of reconditioned fire-fighting equipment

Part 1: Portable and wheeled (mobile) rechargeable fire extinguishers

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Table of changes

Clause Changed	Date	Change

NATIONAL FOREWORD
This Swaziland National Public Review Draft Standard was prepared by Technical committee *SWASA/TC 12 Occupational Health and Safety* in accordance with procedures of the Swaziland Standards Authority, in compliance with Annex 3 of the WTO/TBT Agreement. This national Public Review Draft standard is the modified implementation of SANS 1475-1:2010 and is adopted with the permission of the South African Bureau of Standards (SABS).

Contents

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The production of reconditioned fire-fighting equipment

Part 1:

Portable and wheeled (mobile) rechargeable fire extinguishers

1 Scope

1.1 This part of SANS 1475 covers the administrative and technical details and controls applicable to the acceptable reconditioning of any portable and wheeled (mobile) rechargeable fire extinguisher.

1.2 It covers only those fire extinguishers that have been removed from service and have been presented for reconditioning.

1.3 It does not cover new fire extinguishers or a reconditioned fire extinguisher presented for sale.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that document, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent editions of the standards indicated below. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

SANS 1567, *Portable rechargeable fire extinguishers – CO_2 type extinguishers.*

SANS 1910, *Portable refillable fire extinguishers.*

SANS 6406/ISO 6406, *Gas cylinders – Seamless steel gas cylinders – Periodic inspection and testing.*

SANS 10019, *Transportable containers for compressed, dissolved and liquefied gases – Basic design, manufacture, use and maintenance.*

SANS 10105-1, *The use and control of fire-fighting equipment – Part 1: Portable and wheeled (mobile) fire extinguishers*.

3 Definitions

For the purposes of this part of SANS 1475, the following definitions apply:

3.1

acceptable

acceptable to the authority administering this standard, or to the parties concluding the purchase contract, as relevant

3.2

actual mass

actual weight of charge, cylinder and cylinder fittings including discharge hose assembly, as determined, adjusted if necessary, and recorded by the competent person during the maintenance procedures

3.3

charge

extinguishing medium and the expellants contained in a fully charged extinguisher

3.4

cylinder

outer casing of an extinguisher, that contains the charge and that is provided with an aperture or apertures for charging the extinguisher with the extinguishing medium and when relevant the expellant, and allows for the attachment of cylinder fittings such as nozzles, pressure gauges, closures

3.5

cylinder fittings

those parts of an extinguisher that, under normal working conditions, are permanently attached to the cylinder and that can be subjected to the working pressure

3.6

expellant

agent(s) contained in an extinguisher that provides the internal pressure to expel the extinguishing medium, the pressure being either stored in the cylinder, or generated by chemical reaction, or by the release of auxiliary gas

3.7

extinguishing medium

acceptable product(s) that cause the extinguishing of fire

3.8

gas cartridge

cylinder that is attached externally to the extinguisher cylinder and that contains either compressed or liquefied gas

3.9

halon

halogenated hydrocarbon that is used as an extinguishing medium in the form of a vaporizing liquid (see 5.2.4)

3.10

maintenance

(service)

combination of prescribed actions and measures that are taken by a registered competent person, intended to retain an extinguisher in, or restore it to, a state in which it can perform a required function

3.11

mobile workshop

service vehicle intended to operate away from a permanent workshop for periods in excess of one week

3.12

permanent workshop

premises that are situated on a business site and that are acceptably constructed, protected and permanently equipped (see A.8.1) to cater for the reconditioning of fire-fighting equipment in accordance with the requirements of this part of SANS 1475

3.13

personal supervision

presence of a registered competent person on the site where the work is being conducted to instruct, inspect and demonstrate any activity related to the reconditioning of fire-fighting equipment

3.14

portable fire extinguisher

fire-fighting appliance fully charged and ready for use (of total mass not exceeding 23 kg) that is intended to be carried and operated by one person

3.14.1

external cartridge operated type

extinguisher from which the medium is expelled by means of compressed gas that is released from an externally attached gas cartridge

3.14.2

internal cartridge operated type

extinguisher from which the medium is expelled by means of compressed gas that is released from an internal gas cartridge

3.14.3

stored-pressure type

extinguisher from which the charge is expelled by means of gas that is stored under pressure inside the cylinder and that is in contact with the charge

3.14.4

stored-pressure primary sealed type

stored-pressure extinguisher in which the operating head and valve to control the flow of the medium during discharge, can be detached from the cylinder without releasing the expellant which is retained in the cylinder by a closure that is ruptured on operation

3.15

pressure testing

3.15.1

low pressure testing

testing conducted on fire extinguishers which have a working pressure of less than 3 000 kPa

3.15.2

high pressure testing

testing conducted on fire extinguishers which have a working pressure of greater than 3 000 kPa

3.16

recharging

replacement of an extinguishing medium and, when relevant, an extinguisher's expellant, in order to return the extinguisher to its effective state of operation

3.17

reconditioning

combination of all technical and administrative actions including supervision actions, intended to retain the extinguisher in, or restore it to, a state of full and effective operational readiness (see 5.1.2)

3.18

registering authority

institution recognised by the appropriate government department for the registration of technical personnel involved in the reconditioning of fire extinguishers

NOTE The appropriate government department in South Africa is the Department of Labour.

3.19

responsible person

person (being the owner of the building or a person appointed in writing by the owner) who is responsible for the site control of fire extinguishers and for keeping the necessary records (see SANS 10105-1)

3.20

safety seal

item applied to fire extinguishers to show they are in full operational readiness and that no tampering of the work conducted has occurred

3.21

service vehicle

vehicle that is stocked and equipped with the appropriate powder(s), repair equipment and testing equipment required to service a fire extinguisher effectively in terms of this part of SANS 1475 (see A.8.2.3)

3.22

site control

visual "quick check" external examination of fire extinguisher carried out by the responsible person to ensure that the fire extinguisher is usable and has not been tampered with, that the service due date has not expired and, when relevant, that the necessary arrangements are made to have the fire extinguisher reconditioned

3.23

technical personnel

3.23.1

registered competent person

person who has acceptable qualifications, training and experience to carry out the effective reconditioning of portable fire extinguishers in terms of this part of SANS 1475 and who has been, approved and registered with the registering authority

3.23.2

registered trainee

person who is undergoing the required period of training in order to qualify as a registered competent person and who is registered as a trainee with the registering authority (see A.3.3.2)

NOTE The registered trainee may only be involved with matters relating to the reconditioning of fire fighting equipment under the personal supervision of a registered competent person

3.23.3

service assistant

person who is involved with matters related to the reconditioning of fire extinguishers but only under the personal supervision of a registered competent person

3.24

test pressure

pressure to which a cylinder is subjected in accordance with a design standard

3.25

working pressure

design and marked pressure to which an extinguisher is charged to ensure acceptable operation as defined by the manufacturer

3.26

wheeled (mobile) fire extinguisher

appliance on wheels having a total mass not exceeding 450 kg, which is designed to be operated and transported to the fire by one person

4 General requirements

4.1 Facilities

The reconditioning of extinguishers shall be done in an acceptably managed and equipped permanent workshop, supported, when relevant, by a mobile workshop or service vehicle. (See also annex A.)

4.2 Training and registration of staff

4.2.1 All staff members involved in the reconditioning of extinguishers shall have been trained and, where relevant, registered to ensure that each section of the work is carried out in accordance with this part of SANS 1475.

4.2.2 They shall have been made fully aware of safe working practices and any dangers involved in the reconditioning and use of an extinguisher.

4.3 Pressure test area

4.3.1 Owing to the dangers involved, pressure testing shall be treated with particular caution.

4.3.2 The pressure test area shall be so constructed or arranged that the safety of all personnel is ensured.

4.4 Quality of extinguishing mediums

4.4.1 General

All extinguishing mediums used in the filling of extinguishers shall comply with the original extinguisher manufacturing standard (see also SANS 1910).

4.4.2 Life span of mediums

Unless otherwise specified by the manufacturer, the maximum life span of extinguishing mediums shall be as given in table 1.

Table 1 — Life span of mediums

1	2
Extinguishing medium	**Maximum life span** years
Powder	10
Water	5
Foam	5
Halon	10
Carbon dioxide	10

4.4.3 Re-usable powder

4.4.3.1 If, during maintenance, powder is removed for the effective inspection and control of a cylinder, the powder may be re-used, subject to the following:

a) the powder shall be sieved and if it is determined, during sieving, that the powder is free from lumps and foreign material, the powder may be re-used; or

b) if not (see (a) above), it shall be discarded (see also 5.2.6.2).

4.4.3.2 Different grades and types of powders shall not be mixed.

4.5 Gas supply (expellants)

All workshops involved with the charging of stored-pressure extinguishers shall be furnished with a suitable supply of inert gas and a pressure control system incorporating:

a) pressure regulator,

b) safety relief valve with a pressure of 1,5 times the working pressure, and

c) a working pressure gauge, for the pressurizing (charging) of stored-pressure cylinders.

NOTE The standard(s) relevant to the type of extinguisher being reconditioned should be consulted.

4.6 Removal of extinguishers from a building

NOTE Normally, the site control carried out in accordance with the provisions of SANS 10105-1 will reveal whether an extinguisher requires maintenance and the extinguisher should then be removed for this purpose.

4.6.1 Extinguishers shall be removed for reconditioning and replaced instantly.

4.6.2 If an extinguisher has to be removed from site, not more than 25 % of the available fire extinguishers shall be removed from site at any one time.

NOTE The necessary agreement should be made between the responsible person and the reconditioner regarding the refilling and replacement of used (empty) fire extinguishers.

4.7 Storage area or receptacles for powder

4.7.1 General

Different grades and types of powder shall not be mixed or so stored that they can become contaminated.

NOTE Some powder mixtures react, sometimes after a long delay, to produce water and carbon dioxide, which causes caking of the powder and, in closed cylinders, a rise in pressure. This rise in pressure could cause an extinguisher to burst.

4.7.2 Discarded powder

4.7.2.1 Areas or receptacles marked or identified for the storage of discarded powder before its disposal shall be protected to ensure that the powder cannot in any way cause contamination of new powder or be used unintentionally to charge reconditioned extinguishers.

4.7.2.2 Powders that are collected from the workshop floor or from the floor in the work area shall be discarded.

4.7.2.3 Discarded powder shall be kept in sealed or clearly identified receptacles and discarded in accordance with the provisions of the Hazardous Waste Act and Waste management guidelines.

4.8 Charging of extinguishers

4.8.1 Filling area of permanent workshops

The extinguisher filling area shall be so designed and constructed as to render it free from contamination from other areas and by other services.

4.8.2 Carbon dioxide (CO_2) extinguishers

CO_2 extinguishers shall be charged with CO_2 that complies with the requirements given for CO_2 in SANS 1567.

4.8.3 Foam extinguishers

Foam extinguishers shall be charged only with the type of foam marked on the extinguisher label. If there is no indication of the type of foam on the label, or if the label is missing or illegible, replace the extinguisher with one suitable for the risk.

WARNING: It is important that foam extinguishers are refilled, not only with the correct type

foam, but also with a foam of the correct concentration.

4.9 Protection of workmen

4.9.1 Workmen shall be furnished with the necessary personal protective equipment.

4.9.2 They (workmen) shall have been warned of any dangerous actions and of the presence of any dangerous chemicals.

4.9.3 The protective equipment shall be maintained in a good and clean condition.

5 Requirements for reconditioning (see also annex B)

5.1 General requirements

5.1.1 Reconditioning

Reconditioning of fire extinguishers shall be carried out by a registered competent person, or under his personal supervision.

The organization should be managed in an acceptable way (see annex A).

5.1.2 Extent of reconditioning

Reconditioning of an extinguisher shall ensure that the extinguisher is restored to full and effective operational readiness and complies with the requirements of the original manufacturer.

5.1.3 Extinguisher conversion

An extinguisher of one medium shall not be converted to an extinguisher of another medium.

5.1.4 Topping-up of extinguishing medium

5.1.4.1 If during maintenance, an extinguisher proves to be undercharged or overcharged, and the difference does not exceed 5 % of the marked charge, the extinguisher may be serviced without readjustment of the medium.

5.1.4.2 If the undercharge exceeds 5 %, the extinguisher shall be treated as follows:

a) powder, CO_2 and foam extinguishers shall not be topped up but shall be emptied and fully recharged; and

b) other extinguishers may be topped up.

5.1.4.3 If the overcharge exceeds 5 %, the extinguisher shall be opened and the charge shall be adjusted to fall within the specified limits.

5.1.5 Repair or modification

Repair or modification to the cylinder shall not be permitted.

5.1.6 Maintenance procedures for fire extinguishers

Fire extinguishers shall be maintained in accordance with the details given in annexes C, D and E at the periods given in annex F, together with the relevant steps of the procedure given in 5.2 to 5.6.

5.1.7 Re-coating of aluminium cylinders

Re-coating of aluminium cylinders shall only be carried out in terms of the manufacturer's specification.

WARNING: Due to the effect of heat on aluminium, compliance to the above requirement shall be maintained at all times.

5.2 Safe working practices

NOTE Safe working practices may also refer to in-house practices.

5.2.1 General procedure applicable to all types of extinguisher

WARNING: For safety, consider all extinguishers to be pressurized and therefore the pressure has to be relieved carefully, in an appropriate and safe way, before the extinguisher is opened.

5.2.1.1 After using the working pressure gauge (see 4.5(c)) to ensure that the extinguisher is pressurized to the applicable working pressure, check whether the reading on the pressure indicating device mounted on the extinguisher corresponds with the reading on the working pressure gauge.

5.2.1.2 If it does not, replace the pressure-indicating device and repressurize the extinguisher.

5.2.1.3 Carry out a leakage test and check for compliance with the original manufacturing standard (see 5.5.4).

5.2.2 Carbon dioxide (CO_2) extinguishers

These extinguishers shall be reconditioned in accordance with the safe working practices.

WARNING: These extinguishers are charged to a very high pressure. They may be opened for inspection only after having been fully discharged.

5.2.3 Halon extinguishers

These extinguishers shall be reconditioned in accordance with the manufacturer's specification and, unless exempted from pressure testing by the Department of Labour, these extinguishers shall be replaced with an acceptable type of extinguisher.

WARNING: As these extinguishers are pressurized, they can be opened for inspection only after having been safely depressurized. Compliance with the Montreal Protocol[1)] prohibits the discharge of halons into the free atmosphere. It is therefore recommended that the charge be collected and stored for alternative safe use, if possible. The Montreal Protocol also requires these extinguishers to be phased out.

5.2.4 Dry-powder extinguishers

When any dry-powder extinguisher is opened for inspection and servicing, ensure that the following precautions are observed:

a) in order to minimize the effect of atmospheric moisture on the powder, open the extinguisher in a clean, dry workplace only and for the minimum time necessary for examination; and

b) ensure that the powder that is removed from the extinguisher and which has to be saved during servicing, is stored in properly cleaned, dry storage receptacles.

5.2.5 Stored-pressure dry-powder extinguishers

5.2.5.1 If the powder is free from lumps, cakes and foreign matter, it may be saved for re-use (see 4.7 and 5.2.5(b)); otherwise discard it and replace it with a completely new charge.

5.2.5.2 Under no circumstances may the cakes, lumps or foreign material be removed (for example, by screening) and the remaining portion returned to a fire extinguisher.

5.2.6 Rejection of the cylinder

Condemn any extinguisher cylinder that

a) has been repaired by means of soldering, brazing, welding or the use of patching components,

b) has damaged screw threads,

c) exhibits excessive corrosion, damage, or mechanical markings on the body other than authorized markings applied in terms of the applicable manufacturer's specification,

1) Montreal Protocol, 16 September 1987 .

d) has been burnt in a fire,

e) is of stainless steel and has been in use with a calcium chloride type of extinguishing medium (water and powder with a high chloride content are not compatible with certain types of stainless steel),

f) is constructed of copper or brass joined by soft solder or by riveting or that is manufactured from a non-metallic material (The reliability and safety of such extinguishers cannot be determined by standard pressure testing.), or

g) is unable to be maintained in compliance with the requirements of the original manufacturer.

5.3 Pressure testing (all types of extinguisher)

5.3.1 General

5.3.1.1 During overhaul (see annex E), do the appropriate pressure testing of components, using appropriate equipment and facilities.

5.3.1.2 Ensure that low pressure testing is done by a registered competent person, or under his personal supervision .

5.3.1.3 High pressure testing shall be done in accordance with the provisions of SANS 10019.

5.3.2 Frequency of pressure testing

5.3.2.1 General

Carry out pressure testing of extinguishers when the interval since the last pressure test equals or exceeds the appropriate interval given in column 3 of table F.1, using the appropriate test pressures (see 5.3.3). If the last pressure test date cannot be established, carry out the pressure test.

5.3.3 Extinguisher test pressure

5.3.3.1 The test pressure applied to an extinguisher shall be as indicated on the cylinder.

5.3.3.2 Except CO_2 extinguishers, all other extinguishers shall be tested to a minimum test pressure of 2 000 kPa or 1,5 times the working pressure, whichever is the greater, and maintained for at least 60 s.

5.3.4 Test equipment

5.3.4.1 For low pressure-testing of extinguisher cylinders, use equipment that consists of

a) a hydrostatic test pump of capacity at least 4 000 kPa,

b) a pressure gauge that will give readings accurate to within 2 % (or less) of the test pressure, and

c) the necessary high-pressure flexible connections and range of fittings for attachment of the cylinder to the test pump.

5.3.4.2 Use drying equipment to thoroughly dry all non-water type extinguishers that have been subjected to the pressure test.

5.3.5 Procedure

Carry out pressure testing in accordance with the requirements of the original manufacturer for the class or type of extinguisher being tested.

NOTE Annex G gives a recommended procedure for carrying out the pressure testing on extinguishers.

5.3.6 Failures

When a cylinder fails an hydraulic pressure test (see SANS 6406), it shall be indelibly marked

"CONDEMNED" and returned to the owner in an un-assembled state.

5.4 Records kept by the reconditioning organization

5.4.1 In addition to providing the required label (see clause 6), provide the customer with a record that contains at least the following information, as relevant:

a) name of the customer;

b) date and type of service;

c) date of recharging;

d) date of pressure testing;

e) next service due date;

f) size and type of extinguisher; and

g) location of the extinguisher.

5.4.2 The information shall be kept by the customer (responsible person) for at least 3 years, and when necessary, shall be made available to reconditioning organization for purposes of inspection and updating.

5.5 Recharging (see also 4.8)

5.5.1 Recharging after use

5.5.1.1 Whether an extinguisher was fully discharged during use or not, it shall be fully recharged for future service.

5.5.1.2 The recharging shall be done in accordance with the requirements of the original manufacturer and in accordance with the relevant requirements given in 5.2.

5.5.2 Extinguishing mediums

5.5.2.1 Only extinguishing mediums specified by the original manufacturer of the extinguisher shall be used.

5.5.2.2 Do not use extinguishing mediums that are not clearly identified or that might have been subjected to unsatisfactory storage conditions.

5.5.2.3 Under no circumstances shall extinguishing mediums of different types be mixed.

5.5.3 Control of cartridges (external type only)

5.5.3.1 Damaged cartridges

Discard and replace damaged or corroded cartridges (see SANS 6406).

5.5.3.2 Replacement cartridges

5.5.3.2.1 Ensure that a replacement cartridge is of the capacity and type recommended by the original manufacturer of the extinguisher.

5.5.3.2.2 Before fitting a replacement cartridge ensure that its actual mass is equal to the actual mass marked on the cartridge sticker (see 5.5.3.3), subject to a tolerance determined by the original manufacturer.

5.5.3.3 Recharging of used cartridges

5.5.3.3.1 When, after inspection, a used cartridge proves suitable for re-use, recharge the cartridge with dry carbon dioxide to the full actual mass stamped on the cartridge, subject to a tolerance determined by the original manufacturer.

5.5.3.3.2 Mark the cartridge, by means of a sticker of acceptable quality and purpose, with this mass and the date of filling.

5.5.3.3.3 Place the cartridge in bondage for 21 d and, at the end of this period, check the total mass.

5.5.3.3.4 If there is a reduction in actual mass, consider the cartridge to have failed and repeat the procedure for recharging until no mass loss is noted.

5.5.4 Leakage test

After pressurizing a stored-pressure type extinguisher, carry out the leakage test in accordance with the relevant international and national standards.

NOTE An acceptable method of test is to place the fully charged, pressurized and equipped extinguisher in a water bath and to check if any bubbles are escaping from any part of the complete extinguisher.

6 Marking

6.1 Service labels

When all the relevant inspection and service procedures have been completed, record legibly and indelibly and on an acceptable, waterproof, adhesive label that is firmly fixed to the extinguisher, the following information:

a) name, physical address and contact number of the reconditioning organization;

b) registration number of the registered competent person;

c) date of service;

d) next service due date; and

e) actual mass.

6.2 Pressure test labels

Record legibly and indelibly on a separate, acceptable, waterproof, adhesive label that is firmly fixed to the extinguisher, the following information:

a) name, and contact number of the reconditioning organization;

b) registration number of the registered competent person;

c) date of pressure test; and

d) test pressure in kilopascals.

Annex A

(normative)

Management of a reconditioning organization

A.1 General

The requirements given in this annex are based on SANS 9001, which defines the basic managerial controls necessary to supplement the technical requirements of this part of SANS 1475.

A.2 Organization control

A.2.1 The organization shall employ a management representative (who may be the registered competent person) who is accountable for his own actions and for those of all other personnel who are employed by the organization, permanently or temporarily, in the fulfilment of contracted work on behalf of a client.

A.2.2 It is the responsibility of the management representative to be fully conversant with the requirements and controls set out in this part of SANS 1475, and to ensure that all employees of the organization perform their duties in the approved way.

A.2.3 The management representative may delegate some of his or her responsibilities and the associated authority to other employees of the organization so that they can perform their duties more effectively.

A.2.4 Such delegation (see A.2.3) shall be in writing.

A.2.5 Delegation of responsibility and authority shall be based on demonstrated knowledge, ability and competence in dealing with problems related to reconditioning.

A.2.6 Responsibilities and authorities for the management representative, registered competent person, registered trainees and service assistants shall be clearly documented in writing.

A.2.7 Work instructions shall be prepared and issued for each operation involved in the reconditioning of fire extinguishers.

A.3 Personnel

A.3.1 General

All technical personnel who perform duties in accordance with the requirements of this part of SANS 1475 shall be appropriately qualified.

A.3.2 Identification of registered persons

A.3.2.1 All registered persons shall be in possession of a current registration card issued and controlled by the registering authority.

A.3.2.2 There shall be at least one registered competent person per service vehicle, permanent workshop, mobile workshop, etc.

A.3.3 Responsibilities of technical personnel

A.3.3.1 Registered competent person

The registered competent person shall be responsible for all activities regarding the acceptable and correct reconditioning of fire extinguishers as well as the activities of the registered trainee(s) and service assistant(s) under his or her supervision.

A.3.3.2 Registered trainees

The registered trainees may perform technical activities related to the reconditioning of fire extinguishers, but only under the personal supervision of a registered competent person.

A.3.3.3 Service assistant

The service assistant may perform technical activities related to the reconditioning of fire extinguishers, but only under the personal supervision of a registered competent person.

A.3.4 On-the-job training

A.3.4.1 Special attention shall be paid to on-the-job training of staff.

A.3.4.2 The responsibilities and authority laid down in job descriptions and the details given in work instructions shall also be dealt with during training courses.

A.3.4.3 Records of training shall be kept by the reconditioning organization.

A.3.5 Register of technical personnel

The management representative shall maintain an up-to-date register of technical staff and their approved level of competence.

A.4 Components

A.4.1 All stock items of new fire equipment, mediums and components that are specific to a particular make and type of extinguisher shall be clearly identified and shall be kept separate in a controlled storage area.

A.4.2 An approved supplier list for the supply of new fire-fighting equipment, mediums and components used in the reconditioning of fire extinguishers shall be kept and updated at regular intervals.

A.4.3 There shall be a specifically identified and regularly maintained stock of standby units available for the replacement of fire extinguishers removed from site for reconditioning.

A.5 Hand tools and production control equipment

A.5.1 Hand tools

A.5.1.1 Each service vehicle, mobile workshop and permanent workshop should be equipped with the required hand tools and maintenance equipment.

A.5.1.2 A separate list of all hand tools and maintenance equipment, which may be verified on a regular basis, shall be kept and identified for each place of reconditioning (i.e. service vehicle, mobile workshop and permanent workshop).

A.5.1.3 All hand tools and maintenance equipment shall be maintained in good working order.

A.5.2 Production control equipment

A.5.2.1 All production control equipment (i.e. massmeters, gauges, low pressure test pumps, regulator valves, etc.) required for reconditioning shall be listed. A separate list shall be kept and identified for each place of reconditioning (i.e. service vehicle, mobile workshop and permanent workshop).

A.5.2.2 Production control equipment shall be calibrated against appropriate reference instruments at least once a week and such calibration shall be recorded in writing.

A.5.2.3 Production control equipment shall be stored in locations where it cannot be damaged.

A.5.2.4 All reference instruments referred to in A.5.2.2 shall be replaced or calibrated annually by an approved supplier and the results of calibration shall be recorded.

A.6 Production control

A.6.1 General

A.6.1.1 All reconditioning activities shall be carried out in accordance with the requirements of this part of SANS 1475.

A.6.1.2 Environmental conditions shall not adversely affect the quality of the extinguishing medium or the functioning of the extinguisher.

A.6.1.3 In this regard (see A.6.1.2), special attention shall be paid to conditions prevailing in the vicinity of service vehicles and mobile workshops.

A.6.1.4 Carbon dioxide extinguishers, after having been pressure tested, shall be stamped in accordance with SANS 10019, and the appropriate records shall be kept.

A.6.1.5 A system shall be established to ensure product identification and traceability from receipt until dispatch.

A.6.2 Final inspection

A.6.2.1 Each extinguisher shall be inspected after reconditioning (including filling) to ensure that it complies with all the requirements of the relevant standard.

A.6.2.2 After final inspection, each extinguisher shall be fitted with a service label that gives all the appropriate information and that has been signed by the registered competent person who carried out the final inspection (see clause A.3).

A.6.3 Protection of product quality

Where relevant, a system shall be established to ensure protection during transportation and storage of extinguishers after they have been reconditioned, inspected and signed off.

A.7 Documentation

A.7.1 Complaints

A.7.1.1 Any complaints received shall be investigated, and corrective action taken to prevent a recurrence of the defect.

A.7.1.2 All such complaints and actions shall be recorded.

A.7.1.3 The records shall be kept at the main workshop and shall indicate the name of the employee who dealt with the complaint.

A.7.2 Reference documents

A.7.2.1 The latest editions of the appropriate standards, signed by the management representative, shall be kept.

A.7.2.2 These standards shall at all times be available for reference by any employee.

A.7.3 Document control

A.7.3.1 All issued documents, drawings, records, procedures and instructions shall be controlled to ensure that only up-to-date documents are used.

A.7.3.2 All documents shall be signed and date-marked by the management representative.

A.8 Plant and equipment

A.8.1 Tools and production control equipment in permanent and mobile workshops

In addition to having the required hand tools (see A.5.1), all mobile workshops and permanent workshops shall have their own separate supply of the following:

a) a hydrostatic low pressure testing unit;

b) when relevant, an acceptable high-pressure testing unit;

c) a massmeter of capacity suitable for the duty, and that can measure accurately to within 0,1 kg;

d) a massmeter of capacity suitable for the duty, and that can measure accurately to within 1 g;

e) a sieve with screen of nominal aperture 2 mm;

f) a calibrated reference gauge of diameter size at least 100 mm;
g) regulator valves and safety relief valves;
h) drying equipment;
i) an inspection light; and
j) an acceptable range of calibrated reference masspieces.

A.8.2 Vehicles used for reconditioning purposes

A.8.2.1 Vehicle types

Vehicles shall be acceptably identified for one of the following sets of duties:

a) **delivery vehicle**: for regular inspections, deliveries and collection; or

b) **service vehicle**: for on-site servicing and returning every day to the permanent workshop; or

c) **mobile workshop**: for on-site servicing and away from the permanent workshop for more than one week.

A.8.2.2 Delivery vehicle

It shall not be used for any servicing duties.

A.8.2.3 Service vehicle

A.8.2.3.1 The vehicle shall be acceptably equipped and stocked for the work done and in accordance with the requirements of this part of SANS 1475.

A.8.2.3.2 The vehicle shall be fully enclosed to protect powder and equipment.

A.8.2.4 Mobile workshop

Each mobile workshop shall comply with all requirements applicable to service vehicles (see A.8.2.3).

Annex B

(informative)

Recommended check list

The following check lists are given as a general guide to be followed during the reconditioning of fire extinguishers.

Table B.1 covers the mechanical details and table B.2 covers expellants and other general details.

However, additional requirements may be applied as deemed fit by a registered competent person.

(See also annex A.)

Table B.1 — Item check and corrective action — Mechanical details

1	2	3
Item No.	**Item check**	**Corrective action**
1	**Cylinder**	
1-A	Hydrostatic pressure test date, or date of manufacture	Retest if necessary
1-B	Corrosion	Hydrostatic pressure test and refinish; or discard
1-C	Mechanical damage (denting or abrasion)	Hydrostatic pressure test and refinish; or discard
1-D	Paint condition	Refinish
1-E	Presence of repairs (welding, soldering, brazing, etc.)	Condemn
1-F	Damaged threads (corroded, cross-threaded or worn)	Condemn
1-G	Broken hanger attachment or broken carrying handle lug	Condemn; or consult manufacturer
1-H	Sealing surface damage (nicks or corrosion)	Clean, repair and test for leakage; or discard
2	**Instruction label**	
	Illegible wording	Clean; or replace
3	**Nozzle or horn**	
3-A	Deformed, damaged or cracked	Replace
3-B	Blocked openings	Clean
3-C	Damaged threads (corroded, cross-threaded or worn)	Replace
3-D	Aged (brittle)	Replace
4	**Hose assembly**	
4-A	Damaged (cut, cracked or worn)	Replace
4-B	Damaged couplings or swivel joint (cracked or corroded)	Replace
4-C	Damaged threads (corroded, cross-threaded or worn)	Replace
4-D	Inner tube out at couplings	Repair or replace
4-E	If not electrically non-conductive between couplings (CO_2 hose only)	Replace

Table B.1 (*continued*)

1	2	3
Item No.	**Item check**	**Corrective action**
12	**Operating head assembly**	
12-A	Corroded, cracked or broken	Replace
12-B	Damaged threads (corroded, cross-threaded or worn)	Replace
12-C	Sealing surface damage (nicked, deformed or corroded)	Clean, repair and test for leakage; or replace
12-D	Blocked vent hole or slot	Clean
13	**Carrying handle**	
13-A	Broken handle lug	Discard shell or valve; or consult manufacturer
13-B	Broken handle	Replace; or consult manufacturer
13-C	Corroded, jammed or worn fastener joint	Clean and replace
14	**Safety seals or tamper indicator**	
14-A	Broken or missing	Replace
15	**Pressurizing valve**	
15-A	Leaking seals	Depressurize, and replace valve or core
16	**Gasket, O-ring and seals**	
16-A	Damaged (cut, cracked or worn)	Replace and lubricate
16-B	Missing	Replace and lubricate
16-C	Aged or weathered (compression set, brittle, cracked)	Replace and lubricate
17	**Brackets**	
17-A	Corroded, worn or bent	Repair and refinish; or replace
17-B	Loose and binding	Adjust; or replace
17-C	Worn, loose, corroded or missing screw or bolt	Tighten or replace
17-D	Worn bumper, webbing or grommet	Replace
18	**Siphon tube**	
18-A	Corroded, dented, cracked or broken	Replace
18-B	Blocked tube or blocked tube openings	Clean; or replace
19	**Safety relief device**	
19-A	Corroded or damaged	Depressurize and replace; or consult manufacturer
19-B	Broken, operated or plugged	Depressurize and replace; or repair

Table B.2 — Inspection and corrective action — Expellants and general details

1	2	3
Item No.	**Item check**	**Corrective action**
Self-expelling types		
1	**Carbon dioxide type**	
1-A	Incorrect mass	Recharge to proper mass
1-B	Broken or missing safety seal	Test for leakage, determine mass, recharge, and replace safety seal
Gas cartridge or gas cylinder types		
2	**Dry chemical powder types**	
2-A	Incorrect mass or charge level	Empty and recharge to correct mass
2 B	Agent condition (contamination, caking or wrong agent)	Empty and recharge
2-C	**Gas cartridge (external type only)**	
	a) punctured seal disc	Replace cartridge
	b) incorrect mass	Replace cartridge
	c) broken or missing safety seal	Examine seal disc, replace safety seal
2-D	**Gas cylinder with gauge**	
	a) low pressure	Replace cylinder
	b) broken or missing safety seal	Test for leakage, replace safety seal
2-E	**Gas cylinder without gauge**	
	a) low pressure (attach gauge and measure pressure)	Test for leakage; if normal, repair safety seal; if low, replace cylinder
	b) broken or missing safety seal	Measure pressure, test for leakage, replace safety seal
Stored-pressure types		
3	**Dry chemical powder, refillable**	
3-A	Incorrect extinguisher mass	Empty and recharge to correct mass with correct powder
3-B	Incorrect gauge pressure	Check gauge, repressurize, test for leakage
3-C	Broken or missing safety seal	Replace safety seal, test for leakage
3-D	Agent condition	Replace with correct agent
4	**Halon type**	
4-A	Broken or missing safety seal	Weigh, test for leakage, replace safety seal
4-B	Incorrect gauge pressure	Check gauge, repressurize, test for leakage
4-C	Incorrect mass	Test for leakage, recharge to correct mass
Self-expelling types		
5	**Foam type**	
5-A	Incorrect fill level (by mass or observation)	Empty and recharge
5-B	Agent condition (presence of sediment or other foreign matter)	Empty and recharge
5-C	Incorrect gauge pressure	Check gauge, repressurize, test for leakage
5-D	Broken or missing safety seal	Replace safety seal, test for leakage

Annex C

(normative)

Procedures for maintenance

The maintenance procedures to be carried out by the registered competent person or overhaul centre:

Type A; stored-pressure: water, water based, foam, powder, and halon

Type B; stored-pressure primary sealed: powder and halon

Type C; external cartridge operated: water, water based, and foam

Type D; external cartridge operated: powder

Type E; carbon dioxide

Table C.1 Detailed maintenance procedures

1	2	3	4	5	6	7	8
Examination		**Type of extinguisher**					**Maintenance details**
		A	B	C	D	E	
1	Check the safety device and any other indicating devices	X	X	X	X	X	Check the safety device and any other indicating devices to determine whether the fire extinguisher may have been operated.
2	Verify and check pressure indicating devices	X	X				Where a pressure-indicating device is fitted, check it and if it is not operating freely or if the indicated pressure is outside the specified limits, refer to the manufacturers' instructions for appropriate action. Where a pressure-indicating device is not fitted, use the connection provided for the purpose to verify that the internal pressure is correct. If it is not correct refer to the manufacturers' instructions for appropriate action.
3	Examine the fire extinguisher externally	X	X	X	X	X	Inspect for corrosion, dents, gouges, or damage that could impair the safe operation of the fire extinguisher. If not correct, refer to the manufacturers' instructions or annex B for appropriate action.
4	Weigh the fire extinguisher	X	X	X	X	X	Weigh the fire extinguisher, according to the manufacturers' instructions, and check the total mass against that recorded when last serviced. In the event of a loss of more than 5 %, top up or recharge fully as applicable.

Table C.1 (continued)

1	2	3	4	5	6	7	8
Examination		**Type of extinguisher**					**Maintenance details**
		A	B	C	D	E	
5	Check the condition of the discharge	X	X	X	X	X	Check discharge hoses and nozzles for condition and fitness for use and ensure that the nozzle or hose or both, are unobstructed and not cracked, worn, or damaged. Clean or renew if necessary.
6	Check the discharge hose for any leakage					X	Bump the operating handle to cause a short discharge and leak test.
7	Check the operating instructions	X	X	X	X	X	Check operating instructions for correctness and readability. Renew if necessary.
8	Open the fire extinguisher			X	X		Open the fire extinguisher by unscrewing the top cap and remove the external gas cartridge.
9	**WATER, WATER BASED, AND FOAM** Empty the fire extinguisher			X			Pour the original medium into a clean receptacle and check it according to the manufacturers' instructions if being reused. Where the additive is in a separate container, remove this container and check it for leakage and corrosion. Renew if necessary.
10	**POWDER** Examine the powder of the powder extinguisher				X		Examine the powder in the fire extinguisher to check that there are no visual signs of caking, lumps, or foreign bodies. Agitate the powder by inverting and shaking the fire extinguisher taking care to avoid spillage. If there is any evidence of caking, lumps, or foreign bodies, or if it is not free flowing, or if there is any doubt, discard all the powder and recharge according to the note to annex E.
11	Check all components for operation and serviceability			X	X		Clean if necessary and pass air through the other parts, paying particular attention to the vent holes (or other venting device) in the top cap. Ensure that the hose nozzle strainer (where fitted), internal discharge tube and breather valve (where fitted) are unobstructed. Rectify or renew if necessary. Check the operating mechanism and discharge control (where fitted) for free movement. Clean, rectify or renew if necessary. Protect moving parts and threads against corrosion with a lubricant as recommended by the manufacturer.

Table C.1 (*concluded*)

1	2	3	4	5	6	7	8
Examination		**Type of extinguisher**					**Maintenance details**
		A	B	C	D	E	
12	Check operating mechanism	X	X			X	Where fire extinguishers are designed to have the operating mechanism removed, remove it and check the operating mechanism and discharge control (where fitted) for free movement. Clean, rectify, or renew, if necessary, moving parts and threads against corrosion with a lubricant as recommended by the manufacturer.
13	Examine the gas cartridge			X	X		Examine the gas cartridge externally for corrosion or damage. If replacement is necessary, replace in accordance with manufacturers' instructions. Weigh the gas cartridge in accordance with the manufacturers' instructions.
14	Renew relevant O-rings, washers and hose diaphragm	X	X	X	X	X	Renew all relevant O-rings and washers in accordance with the manufacturers' instructions. If the hose is fitted with a diaphragm, this diaphragm shall always be renewed.
15	**WATER, WATER BASED, AND FOAM** Examine the fire extinguisher cylinder internally			X			Inspect internally with the aid of an inspection light. Check for corrosion or lining deterioration. Check separate cylinders for additives and renew if leaking or damaged.
16	**POWDER** Examine the fire extinguisher cylinder internally				X		Examine the fire extinguisher as far as possible. Inspect internally with the aid of an inspection light. Check for corrosion and deterioration of lining (if fitted)
17	**WATER, WATER BASED, AND FOAM** Refill the fire extinguisher			X			Return the original medium into the fire extinguisher, or replace according to the manufacturers' instructions.
18	Reassemble and refill the fire extinguisher where relevant	X	X	X	X	X	Reassemble and refill, where relevant, the fire extinguisher in accordance with the manufacturers' instructions. Refit the safety device (device to prevent inadvertent operation) and fit safety seal as necessary.
19	Complete the service label	X	X	X	X	X	Complete the details on the service label as specified.

Annex D

(normative)

Extended maintenance procedures

D.1 The procedures of table C.1 are carried out with the procedures of this annex.

D.2 Check the function of the pressure indicating devices, where fitted, of stored-pressure fire extinguishers, according to the manufacturers' instructions.

D.3 Empty all fire extinguishers, except the halon and CO_2 types.

D.4 Examine the extinguishing media in accordance with the manufacturers' instructions, (see NOTE to annex E).

D.5 Examine in detail for corrosion, damage, dents, gouges on

a) top cap and valves,

b) indicators, and

c) discharge hose and nozzle.

D.6 Examine the cylinder externally and internally in detail for corrosion, dents, cuts, gouges or lining damage. Special attention shall be given to the welds. In case of doubt about welds, follow the instructions of the manufacturer.

D.7 Examine and check all closures for correct thread, form, size and coating.

D.8 Return to operational condition. Reassemble and refill the portable fire extinguisher in accordance with the manufacturers' instructions.

D.9 Fit new safety seal and complete the service label.

Annex E

(normative)

Overhaul procedures

E.1 The procedures of table C.1 and annex D are carried out with this annex.

E.2 Strip down completely the components of the portable fire extinguisher and replace all damaged components.

E.3 Pressure test the cylinder to the specified test pressure (see 5.3.3).

E.4 Replace or check the safety device in accordance with the manufacturers' instructions.

E.5 Reassemble, and recharge the fire extinguisher, fit new safety seal and complete the service label and pressure test label.

NOTE Powder may absorb deleterious amounts of moisture if exposed to air of high relative humidity, or if the powder is colder than the ambient air.

Annex F

(normative)

Intervals for maintenance of fire extinguishers

F.1 The intervals for maintenance of fire extinguishers shall be as given in table F.1.

Table F.1 — Maximum maintenance intervals and maximum service life

1	2	3
Type of fire extinguisher	**Maintenance interval (annex C)**	**Maximum maintenance and overhaul interval (annex D and annex C)**
Foam, water and water based	6 months	Every 5 years
Powder	6 months	Every 5 years
Halon	6 months	Every 5 years
CO_2	6 months	Every 10 years

F.2 The intervals are from the date of installation of the fire extinguisher but not later than one year after the date of manufacture marked on the body.

Annex G

(informative)

Extinguisher pressure test procedure

G.1 Remove all valves, internal parts, and hose assemblies and empty the extinguisher.

G.2 Remove all traces of extinguishing media from inside the cylinder of all powder types of extinguishers.

G.3 Remove and test separately the hose (complete with the couplings but without the discharge nozzle) of all wheeled extinguishers equipped with a shut-off nozzle at the outlet end of the hose.

G.4 To conduct maintenance or a hydrostatic test, disconnect the regulator or low-pressure hose from the media cylinder on wheeled extinguishers equipped with a regulator(s),

G.5 Remove the head assembly on all wheeled stored pressure powder extinguishers and replace with an acceptable test closure.

G.6 Using a flexible connection, attach the hose of the hydrostatic test pump to the discharge nozzle, hose assembly, test bonnet, or test fitting as is applicable. In the case of wheeled powder extinguishers, procedures and fittings should be those prescribed by the manufacturer.

G.7 Turn on the water supply to the test pump and fill the extinguisher to the top of its collar.

G.8 For extinguishers tested with their top caps on, tighten the cap slowly while the water supply remains open. When all of the entrapped air within the cylinder has been bled off and after water emerges, tighten the cap fully.

G.9 For extinguishers tested with a test closure or fitting, tighten the bonnet or fitting fully while the water supply remains open. When all of the entrapped air within the cylinder has been bled off and after water emerges, close the vent tightly.

G.10 Apply pressure at an even rate of pressure rise until the test pressure is reached. Maintain this pressure for at least 60 s. Make observations at this stage to note any distortions or leakages of the extinguisher cylinder.

G.11 If no distortion or leakage is noted and if the test pressure has not dropped, release the pressure on the extinguisher cylinder. The extinguisher is then considered to have passed the hydrostatic test.

Annex H
(informative)

Protective clothing

H.1 Protective clothing shall include the following;

a) hard hat

b) respiratory protection

c) eye protection

d) hearing protection

e) gloves

Bibliography

ISO 11602-2, *Fire protection – Portable and wheeled fire extinguishers – Part 2: Inspection and maintenance*.

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SANS 1522, *Fire extinguishing powders*.

SANS 9001/ISO 9001, *Quality management systems – Requirements.*

